

Space News ROUNDUP!

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In this issue



Lunar Prospector begins its search for water on the Moon.

Page 2



Astronaut Andy Thomas will close out the American presence on Mir.

Page 3



Photographs tell the story of the year 1997 at JSC.

Page 4



Perseverance pays off as X-38 developers overcome parachute snag.

Page 5



Road work was a major concern at the Manned Spacecraft Center 35 years ago.

Page 6



Sixty-nine JSC workers recently earned Silver Snoopy Awards.

Page 7

New internal home page goes on-line

By Mike Garren

Starting Jan. 20, employees will be able to get the information they need faster using the new JSC Internal Home Page on JSC's intranet. The new internal home page is better organized which means it will be easier to find information.

"All of the 'big hit' items have been transformed into icons and located at the top of the page," said



Marcus Friske of the Information Systems Directorate's Information Technology Office. Importance and number of past hits or requests for information helped determine what became an icon.

As an example, the JSC online

phone directory is "hit" or accessed thousands of times a month. Therefore the phone list icon appears at the top of the new page. Just point your computer's cursor at the image of the telephone, "click" with your left mouse button and the JSC

online Phone List screen is ready to serve you.

Click the "Search" icon and trigger a powerful new search engine that helps you find information located centerwide. "Safety and Total Health," "ISO-9000," a "JSC Organization List" and "What's New" complete the clickable images near the top of the page. Information activated by these colorful graphical icons

Please see **ISD**, Page 8



NASA Photo

The STS-89 crew poses in the white room at the entrance to *Endeavour* at Kennedy Space Center's Launch Pad 39A during Terminal Countdown Demonstration Test activities. From left are Mission Specialist James Reilly, Pilot Joe Edwards, Commander Terry Wilcutt; Mission Specialists Bonnie Dunbar and Salizhan Sharipov. In back are, from left to right, Mission Specialists Andrew Thomas and Michael Anderson.

Endeavour, crew ready for launch

By Kyle Herring

Endeavour sits poised on the launch pad ready to return to space after a year and a half hiatus with the countdown set to begin early next week for the next shuttle launch to Mir on the night of Jan. 22.

The launch team and the flight crew completed the traditional launch countdown dress rehearsal last weekend. Commander Terry Wilcutt, Pilot Joe Edwards, Payload Commander Bonnie Dunbar and Mission Specialists Jim Reilly, Mike Anderson, Salizhan Sharipov and Andy Thomas climbed aboard the orbiter early Saturday morning for the Terminal Countdown Demonstration Test, which culminated with a simulated main engine shutdown.

Thomas will ride to Mir as the replacement for David Wolf who has been aboard the station since *Atlantis'* last visit to the station in September.

If all stays on schedule, *Endeavour* will liftoff at 8:48 p.m. CST Thursday and dock with Mir on Saturday shortly after 2 p.m. After five days of joint operations, *Endeavour* will back away from Mir just before 11 a.m. Jan. 29 and land back at Kennedy Space Center about 4:30 p.m. Jan. 31.

Please see **ENDEAVOUR**, Page 8



JSC employees receive pay increase

JSC civil service employees will see a pay increase of about 2.7 percent this month.

The pay increase includes a 2.3 percent general increase that Congress approved for all federal employees, and a 0.4 percent locality pay component, said Ted Boyes, JSC's classification and wage officer.

For example, a GS-12, Step 1, employee who made \$47,831 in 1997 will make \$49,124 in 1998. A

full 1998 salary table is available in the "What's New" section of the Human Resources Office home page on the Internet at: <http://hro.jsc.nasa.gov/>.

A JSC Announcement and pay table also will be distributed to all civil service employees.

White Sands Test Facility employees will receive a 2.9 percent increase overall; a 0.6 percent locality pay component accounts for the difference.

JSC employees have been receiving varying locality pay components for several years as the total of 11.96 percent is phased in. Houston has the second highest locality pay component in the country.

In Houston, some employees will receive only a 2.3 percent increase because they are on special occupational pay schedules. These employees, most of whom are GS7-11 engineers or medical officers, are not eligible to receive

locality pay because their pay schedules already exceed that raise.

The raise officially went into effect Jan. 4, and employees will see it in their pay checks Jan. 27, Boyes said.

Senior Executive Service, Senior Scientific and Professional and NASA Excepted Senior level pay schedules will get both general and locality increases, subject to a pay cap of \$125,900, Boyes added.

Rothenberg to head office of space flight

Joseph Rothenberg, director of Goddard Space Flight Center, has been named to head the agency's Office of Space Flight, NASA Administrator Daniel S. Goldin announced last week.

Rothenberg will lead the Human Exploration and Development of Space enterprise.

Goldin named Alphonso Diaz to succeed Rothenberg as Goddard's director. Diaz currently is the deputy director at Goddard.

Rothenberg will be responsible for all NASA human space flight programs, as well as a variety of expendable launch vehicle operations and tracking and communications functions. The appointment

was effective Monday.

"I am pleased that Joe Rothenberg is joining our senior management team at NASA Headquarters," Goldin said. "He brings a wealth of experience and a fresh perspective as NASA's human space flight enterprise enters a new era with the construction of the International Space Station. NASA Goddard has thrived under his leadership over the last three years, and now I have asked him to turn his talents to another set of challenges. I know Goddard will be in capable hands with Al Diaz at the helm."

Rothenberg began his aerospace career with Grumman Aerospace in 1964, where he managed the devel-

opment of flight hardware, test and launch systems for the Orbiting Astronomical Observatory series of spacecraft. In 1983, he joined NASA Goddard as operations manager for the Hubble Space Telescope, leading the team which developed the orbital operations of the telescope.

In April 1987, he was appointed chief of the Mission Operations Division at Goddard. In September 1989, he was named deputy director of Mission Operations and Data Systems, and from 1990 to 1994 he served as associate director of flight projects for the space telescope. Rothenberg provided the project leadership which resulted in

Please see **ROTHENBERG**, Page 8



Joseph Rothenberg

Mir crew gearing up for visit by *Endeavour* astronauts

Mir 24 Commander Anatoly Solovyev, Flight Engineer Pavel Vinogradov and U.S. Astronaut David Wolf are gearing up for next week's scheduled launch of *Endeavour* on the eighth mission to link up a shuttle to the Mir Space Station following space walk activity over the past 10 days in the name of science and Mir systems.

Solovyev and Vinogradov ventured outside Mir late in the day Jan. 8 to survey the hatch to the outer airlock on the Kvant-2 module from which space walks are normally staged and to retrieve an experiment called the Optical Properties Monitor, which was deployed outside the Mir last April during a space walk by Astronaut Jerry Linenger.

The Kvant-2 airlock has failed to hold pressure since late last year, possibly because of a problem with the hatch seal. Since then, space walks have been conducted from an inner airlock in the Kvant-2 module, which serves as a backup. During the four and a half hour space walk, Solovyev and Vinogradov reported to Russian flight controllers that one of 10 primary latches that hold the airlock hatch firmly shut appeared to be broken. Secondary latches were used to seal the hatch at the conclusion of the space walk, but pressure dropped again in the airlock over the

weekend. Russian engineers are continuing to evaluate additional options for further attempts at maintaining the proper pressure in the airlock.

Pending final joint approval by NASA and Russian officials, Wolf was scheduled to join Solovyev outside Mir on Wednesday for a two and a half hour space walk to conduct tests with a portable spectrometer designed to analyze the effect of the space environment on the exterior of the Mir. The data will be used to better characterize what may be needed for additional protection for the components of International Space Station against

the harsh environment of low Earth orbit.

Wolf's space walk, if approved, would be the third by a U.S. astronaut in a Russian suit. Linenger conducted the first space walk by an American in a Russian extravehicular mobility suit last April, and Michael Foale joined Solovyev outside Mir last September to survey damage to the Spektr module.

The OPM will be returned to Earth aboard *Endeavour* at the conclusion of the STS-89 mission, which is scheduled for launch Jan. 22. Aboard *Endeavour* will be Astronaut Andy Thomas, beginning a four-month stint aboard Mir, replacing Wolf as the final U.S. astronaut to occupy the Russian outpost. Thomas will return to Earth on STS-91 in June.



Spacehab gets JSC contract

Work to focus on research, logistics support activities

JSC has awarded a \$42.86 million, two and one-half year contract to Spacehab Inc., Vienna, Va., for research and mission logistics support.

Spacehab will perform the work in the NASA Payload Processing Facility at Cape Canaveral, Fla. The total awarded price of the contract, inclusive of all options, is \$60.72 million and is anticipated to extend for approximately three years.

The basic contract is for the lease of the Spacehab modules, and for integration and operations services supporting the Space Shuttle Program for three missions.

The contract also covers four options involving varying module types to be leased for an additional mission. It is a follow-on contract to the Spacehab Phase 1 contract, which involves services in support of the shuttle-Mir program.

The new contract will provide logistical support to the International Space Station, and both NASA and commercial science experiments.



NASA Photo

NASA's Lunar Prospector spacecraft launches on its way to the Moon from Launch Complex 46 at Cape Canaveral Air Station at 8:28 p.m. CST Jan. 6. It was the inaugural launch of Lockheed Martin's Athena II launch vehicle and the first launch from LC46, operated by Spaceport Florida Authority. Lunar Prospector, built for Ames Research Center by Lockheed Martin, is a spin-stabilized spacecraft designed to provide NASA with the first global maps of the Moon's surface and its gravitational magnetic fields, as well as look for the possible presence of ice near the lunar poles.

Lunar Prospector performing well

The Mission Control Center at NASA's Ames Research Center reported early this week that the Lunar Prospector spacecraft had successfully completed two-thirds of the maneuvers required to put it into its final desired mapping orbit 62 miles above the lunar surface.

That was achieved with Monday morning's second lunar orbit insertion burn, which placed it in an orbital plane that is almost perpendicular to the Earth-Moon line, so that the spacecraft never gets behind the Moon as seen from Earth and continuous communications can be maintained. The third and final LOI burn was scheduled for Tuesday morning.

The spacecraft continues to perform precisely as planned. The spacecraft's science booms have been completely deployed and all science instruments have been turned on. Data is flowing from the omni antenna, and the spacecraft is spinning at 12.15 rpm.

NASA's Discovery program of low-cost, science-focused space exploration missions got off to a smooth start Jan. 6 with the successful launch of Lunar Prospector.

The Lockheed Martin Athena II launch vehicle roared off Spaceport Florida's pad 46 at the new, commercial launch complex at Cape Canaveral, Fla., on schedule at 8:28 p.m. JSC time less than one second into the opening of the window.

The launch vehicle's three stages worked as planned, rocketing the spacecraft to an altitude of 62,500 feet after 88 seconds at Stage 1 burnout. All milestones were achieved on schedule during the remainder of the ascent phase, culminating in attainment of a successful "parking orbit" around the Earth at an altitude of 125 statute miles.

After completing almost three-quarters of a revolution around the Earth, the vehicle's Trans Lunar Injection stage completed a successful 64 second burn, blasting the spacecraft out of Earth orbit and setting the spin-stabilized vehicle on its 105-hour "coast" to the Moon.

Payload separation from the third stage of the launch vehicle was successful, and spacecraft activation was accomplished 56 minutes after launch.

Lunar Prospector is designed to provide a precise global map of the Moon's surface element composition and its gravity and magnetic fields.

Lunar Prospector will conduct a one-year primary mission, mapping the surface composition and internal structure, volatile activity, and magnetic and gravity fields of the Moon from an altitude of approximately 63 miles. Lunar is expected to provide definitive evidence of the presence or absence of water ice in shaded lunar polar regions.

The Prospector web site may be found at: <http://lunar.arc.nasa.gov>.

One of Milky Way's biggest stars may be a double

One of the Milky Way Galaxy's largest stars may in fact be a double star system, according to recent research by a team of astronomers using NASA's Rossi X-ray Timing Explorer spacecraft.

The team's results were the subject of a Jan. 7 presentation in Washington, D.C., at the winter meeting of the American Astronomical Society.

The team, led by Dr. Michael Corcoran of the Universities Space Research Assoc., bases its conclusions on unusual variations in the intensity of X-rays emitted by hot

gas near the star, called Eta Carinae, which is about 7,500 light years from Earth. They believe that the variations are caused by the presence of a massive companion star in orbit around Eta Carinae.

The new work offers insight into the origin and evolution of a class of stars called luminous blue variables, which are the most massive stars known.

"Stars such as these shine so intensely that, sometimes, they become unstable and blow their outer layers off," said Corcoran. "That's what happened to Eta

Carinae. During the mid-1800s, it blasted an amount of material equivalent to the mass of our entire solar system into space. The gas and dust that make up this material formed a shell that surrounds the star and now blocks it from direct view. We have taken what amounts to an X-ray of this shell and found that what's inside may really be two stars."

While using the Rossi Explorer to monitor the X-ray emission from Eta Carinae every week for a period of two years, the team found that X-rays emitted by hot gas near the star

initially increased over a period of months and then rapidly diminished in intensity in a matter of days.

Such variability is highly unusual and has never before been observed for Eta Carinae. The simplest explanation is that the variability of the X-ray emission is due to the presence of a massive stellar companion orbiting the star, bound to each other by the force of gravity.

The presence of such a companion has recently been claimed based on variations in near-infrared and optical spectra by Dr. Augusto Damineli and collaborators at the

University of Colorado at Boulder. However, the presence of the "companion" star remained controversial, since the spectrum of Eta Carinae is notoriously variable. As a result, the "binary model" for Eta Carinae has not yet been generally accepted by astronomers. The X-ray variations may help change this situation.

"We believe the orbit of the companion star is elongated into an ellipse," Corcoran said, "which alternately moves it closer to and further away from Eta Carinae over the five-and-a-half year orbital period."

Scientists say 'Old Faithful' black hole regularly ejects mass equal to asteroid

Scientists observing a disk of matter surrounding a black hole in our galaxy have discovered that the disk is periodically disrupted and hurled outward in opposite directions from the black hole, in jets moving at nearly the speed of light. The black hole replenishes the disk by pulling hot gas from the surface of a nearby "companion" star, and then undergoes another disruption, repeating the sequence at half-hour intervals.

The researchers represent teams at the California Institute of Technology, the Massachusetts Institute of Technology, and

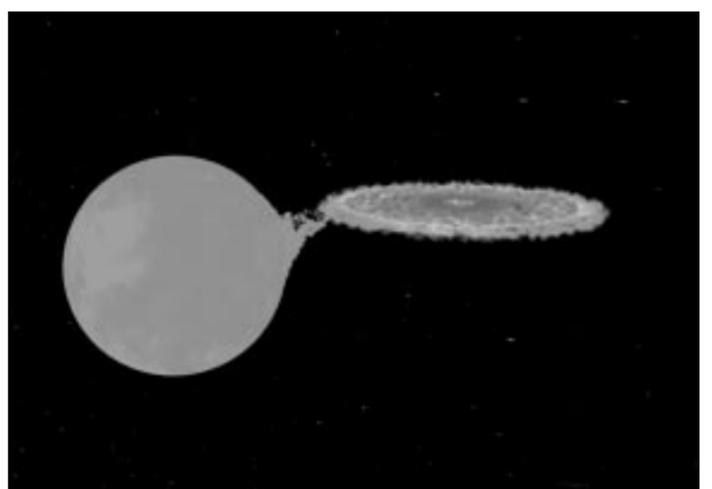
Goddard Space Flight Center, which all worked to correlate the disappearance of X-ray emitting hot gas with the appearance, shortly thereafter, of rapidly expanding jets.

Dr. Ronald Remillard of MIT and Dr. Jean Swank of Goddard presented X-ray results, obtained with NASA's Rossi X-ray Timing Explorer which show the disappearing disk. Dr. Stephen Eikenberry of Caltech discussed new infrared observations, which demonstrate that when the X-rays from the disk vanish, the jets suddenly appear. The observations were presented Jan. 7 during the winter meeting of the American

Astronomical Society.

The disks of hot gas, known as accretion disks, are commonly observed around black holes with orbiting stellar companions, but the near simultaneous disappearance of the disk and formation of the jet has never been seen before. It promises to shed light on the origin of the enigmatic jets, also commonly observed near accreting black holes, but poorly understood.

"The system behaves like the celestial version of Old Faithful," noted Dr. Craig Markwardt, a researcher working with Swank at



NASA Photo

A black hole being studied with NASA's Rossi X-ray Timing Explorer collects hot gas from a nearby companion star.

Please see **POWERFUL** Page 8

From outback to outer space

Thomas set to bridge first, second phases of space station as last American aboard Russian station

A year ago this month Astronaut Andy Thomas volunteered to train as backup to the final U.S. crew member scheduled aboard Russia's Mir Space Station. He would fly on the world's only space station if, and only if, the primary astronaut was unable to fulfill the requirement ...

By Kyle Herring

... Or suddenly be moved to an earlier slot, opening the door—or hatch, as the case may be—for another astronaut to wind up the Phase 1 Program.

Well, that's exactly what happened when a series of decisions led to Dr. David Wolf flying earlier in the shuttle launch schedule. That left an empty seat for Thomas on the middeck of *Endeavour* flying to Mir next week with a return ticket assured on the lower deck of *Discovery* in June. That flight will mark the final visit of a shuttle to the orbiting laboratory, completing more than two years of continuous U.S. presence on Mir, which began in March 1996.



Surprise would be an understatement as to Thomas' reaction when the decision was made that Wendy Lawrence would not visit Mir for a long-duration stay putting Wolf in the slot she would have taken and elevating (literally) Thomas to one of on-orbit scientist rather than earthbound backup.

"I remember that day when those changes were made," Thomas says. "And over the course of about 15 minutes, I learned that the world changed very dramatically for me in a big way."

Thomas reacted with "an element of disbelief because I went to Russia expecting to be trained as a backup with a low likelihood of flying." He adds, jokingly, that "it certainly made me a whole lot more interested in the training."

That training at the Gagarin Cosmonaut Training Center on the outskirts of Moscow is viewed by Thomas as an "extraordinary" and "fascinating" experience.

"I worked quite hard to create this opportunity and position myself for it," he says, "but never in my wildest dreams would I have ever imagined that I would go through basic cosmonaut training and that's just been an extraordinary experience to do that. To live in Russia, and to go through that whole fascinating training flow has been a great personal reward to me. And even if I had not gotten a flight out of this, I still would have been very happy with the outcome."

Now that the opportunity to fly in space on the last long-duration mission of the Phase 1 Program has presented itself to Thomas, he plans to make the most of it by following in the footsteps of his predecessors.

"It is an amazing opportunity to be with a collection of astronauts—my predecessors on Mir—who have completed these missions successfully," he says. "They are all going to be tough acts to follow."

A native of Australia, Thomas recognizes the warmth and support his home country has provided him throughout his career, but sees this trip to space as a bit more.

"I think this is probably a major defining experience in my life and I

do have a sense of pride," he says. "Perhaps not so much national pride as just basic pride in having stepped up to this opportunity and seen it through."

And his family's reaction to his announcement that he would fly on Mir in the wake of several niggling problems?

"When I first told them I was going to Russia as a backup there was sort of a question in their mind," he says. "They didn't really understand why (I'd) do it if there's not a flight. And they didn't understand that there were a lot of benefits that I would accrue professionally from the experience even though I wouldn't have gotten a flight."

"They were very pleased to hear that I was going to fly on Mir although they did have some concerns because they, like everyone else, had been seeing the popular press which I think presented a rather jaded view of activities on Mir. I didn't have to convince them that it was safe for me to go. I think they trusted my judgment about what I was doing and knew that I certainly wouldn't do anything that was unsafe."

Though Thomas has not done anything particularly extraordinary to prepare for this more than four month trip, he says he feels the hours spent at Star City alone studying the Russian language will be of great benefit to adjusting to life aboard Mir.

"The biggest preparation item of this whole thing is to develop some skill at Russian. In that process of living in Star City and studying," Thomas says, "you tend to be somewhat isolated from people and you spend a lot of time alone and studying so that perhaps does prepare you in some sense for a long-duration flight."

As the time draws near for *Endeavour's* launch, Thomas reflects on his thoughts as the hatches close between the orbiter and station leaving him with his cosmonaut colleagues Anatoly Solovyev and Pavel Vinogradov—no longer strangers to working with their American friends.

"I've tried to project myself into that scenario and, you know, it's pretty tough to do because there are so many emotional issues and physical issues involved," he says. "You've just come through a launch into space. You're orbiting the Earth. You're doing something you've been trained for, and suddenly you're no longer in a U.S.-made vehicle. You're in a Russian piece of hardware with a Russian crew."

"I think it's got to be a very emotional moment because you're saying good-bye to your friends ... and now the work starts. The real work starts and you've got a big commitment of time and discipline ahead of you to complete the flight program."

On the other hand, Thomas expects to feel some amount of relief that the experiment work he trained for finally will be getting under way after the hatches close.

"I think it's going to be an emotional moment, but I think it'll be a good moment because at last, now we're getting on with it. We can put the training aside and we can really do this properly," he says.



Above: Astronaut Andy Thomas poses for a Mir 25 crew portrait with Mir-25 Flight Engineer Talgat Musabayev, center, and Commander Nikolai Budarin, right, with whom he trained in Russia. Musabayev and Budarin will follow Thomas to Mir, launching later this month along with French cosmonaut Leopold Eyharts. That crew will replace Mir 24 Commander Anatoly Solovyev and Flight Engineer Pavel Vinogradov, who will return in mid-February with Eyharts. Thomas expects emotions to run high upon his departure in early summer.



Thomas spent a year training in Russia for his upcoming stay aboard the Mir Space Station, first as a backup crew member and now as the last American astronaut scheduled to live on the station, completing the Space Shuttle Phase 1 Program of shuttle dockings with Mir and a continuous American presence aboard the Russian outpost that began in March 1996. Above left: Thomas sets off an orange smoke flare during water survival training in the Black Sea. Above right: Thomas warms himself by a fire in Siberia during cosmonaut land survival training.

Thomas says he can only imagine how he will feel upon *Discovery's* arrival to bring him home. He will spend the last half of his increment aboard Mir with a new crew with which he has trained in Star City. Talgat Musabayev and Nikolai Budarin will launch later this month along with French cosmonaut Leopold Eyharts. That crew will replace Solovyev and Vinogradov, who will return in mid-February with Eyharts. Thomas expects emotions to run high upon his departure in early summer.

"Well I think having just spent four and a half months with Talgat and Nikolai, living every day with them, and being part of that team," he says, means "it's going to be tough to just close the hatch on them and say good-bye."

On the flip side, Thomas says he believes ending the Phase 1 Program will be good, also, "because I'll be coming home and I will have completed my flight program and I will have completed a challenge that I had put ahead of me more than a year ago—to undertake the learning of the language, the learning of the Russian systems, and to undertake the Russian training, which is not an easy thing, and then to fly."

Completing the program "is going to be a very rewarding moment," Thomas says. "To be able to say to myself that I've done it; I've completed this program."

Phase 1's momentum will carry the space programs of the U.S., Russia and the remaining interna-

tional partners into the next step, the assembly in space of the International Space Station. Should the schedule hold, the first element to be launched will be moved from its gigantic assembly plant outside Moscow to the Baikonur launch site in Kazakstan. It is set for launch on a Proton launcher on the last day of June—just days after Thomas returns home.

"It is important, I think, that somehow we look at the shuttle-Mir program and the lessons learned, and the mistakes made ... and make sure that we benefit from those lessons learned." Thomas says more information will always be needed to further our knowledge of life in space.

"If you're doing studies on the way the human body reacts to some stressful environment and you only have seven test subjects, that's not very much," he says. "So every additional data point you get is a large proportion of your whole data that's available to you. So we're not just polishing, or refining. We're substantially building on the database."

Now that the launch is days away, Thomas spends his time refreshing the training he has undergone, first as Wolf's backup and now as the prime crew member to stay aboard Mir. He says he has no apprehensions about the actual stay on Mir, but only the usual thoughts on the preparation.

"You have the usual apprehensions about training for a space flight: Has the training covered everything that you need to know?

Is there some aspect of this that you've overlooked? You hope there isn't," Thomas says. "Or in the case of long-duration space flight, am I taking everything that I need in order to complete the work up there in order to live comfortably. There's always a little concern that you might have forgotten something that you'll come to miss. But I don't have any other apprehensions about this trip at all."

His space flight experience to date has consisted of a single shuttle flight on the STS-77 mission in May 1996. That, coupled with the training in Russia hopefully has provided experience for the future—whatever that may hold for Thomas.

"After this trip into space it would seem to me that the experience of having trained in Russia, as well as the experience of having flown a long-duration space flight, would be invaluable to support the programs that we have in the International Space Station," he says.

Does that mean another trip into space for a lengthy period is in the offing for Thomas?

"I've been asked that," he says. "And I'll have to wait and see how I feel about this. I don't know, maybe I've only got one long-duration flight in me and that'll be enough, but I'll see. I'm keeping an open mind on it."

His open-mindedness is what led Thomas to volunteer for, first the training, and now the space flight to move the world one orbit closer to the beginning of the assembly of the International Space Station.



January

←
Astronaut John Blaha autographed photographs for friends and family members who welcomed him home after his four-month stay on the Russian Mir Space Station.

February →

The first Texas longhorns to grace JSC pastures left their trailer and entered their new home west of Rocket Park. The Longhorn Project is a joint educational effort by JSC, the Clear Creek Independent School District and the Houston Livestock Show and Rodeo's local subcommittee.



March

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JSC Director George Abbey talked with NASA Administrator Daniel S. Goldin and restaurant owner Giuseppe Camera after Abbey received the National Space Trophy.



1997 the Year in Pictures



May ↑

Members of the JSC consulting team reviewed the final plan for second floor exhibits in the new Moody Gardens Discovery Pyramid, seen in the background. The new pyramid, with its space-related exhibits developed by JSC volunteers, opened in June.



April

←
After spending 60 days in an air-tight chamber, Team Lead Terry Tri opened the door in Bldg. 7 and he, Karen Meyers, Fred Smith and David Staat emerged from the Lunar Mars Life Support Test Project Phase IIA test. At the end of the year, another team—Nigel Packham, Vickie Kloeris, John Lewis and Laura Supra—completed a 90 day stay in the chamber.

June

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JSC Director George Abbey showed off a new shirt for sale in the revived Bldg. 3 Exchange Store as Karl Schuler, chairman of the retail team that helped develop the inventory of new items and services available, looked on.



July

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A White Sands Test Facility worker reassembled the fleet leader orbital maneuvering system engine after using it to certify a water decontamination procedure that will be easier on the environment and save taxpayers about \$500,000 per engine.

August

Youngsters visiting during the JSC Open House got a chance to sit at the very consoles that were used to help put men on the Moon.
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September

←
STS-88 Astronauts Jerry Ross and Jim Newman practiced the moves they'll make for the first International Space Station assembly mission in the Sonny Carter Training Facility's Neutral Buoyancy Laboratory.



October →

DynCorp employees worked closely with NASA personnel to install new "glass cockpit" digital avionics and computer displays in JSC's T-38 astronaut training aircraft fleet.

November

→
JSC employees stood down from their daily tasks and suited up for a fun as the annual Safety and Total Health Day got off to a great start.



December

←
Inspection 97 volunteer Jason Andringa, right, described an animated presentation of the X-38 crew return vehicle as the center showed 2,500 visitors from 45 states the kind of technologies being developed at JSC.

Parafoil, Pallet Progress

X-38 developers use ingenuity to overcome challenge of parafoil 'reefing' in time to prepare for drop tests

By James Hartsfield

Developers of the X-38 prototype International Space Station crew return vehicle overcame one of the toughest challenges faced by the team so far with the recent successful pallet drop test of a stronger and more stable parafoil.

The project is now on track toward a drop test of the first unpowered X-38 atmospheric test vehicle at the Dryden Flight Research Center in early February, said X-38 Project Manager John Muratore. The parafoil difficulties began for the X-38 team last summer as tests were under way on techniques for reefing the parafoil to increase its stability and uniformity during deployment. In a modification of a technique used in sport parachuting, the team was testing a system called "Zero-Stage Reefing" that holds the giant, rectangular X-38 parachute into a more round shape for a few seconds after its deployment, making it more stable.

To the team's surprise, during a pallet drop test of the new reefing system in October 1997 in Yuma, Ariz., the parafoil tore completely in half. The team went back to the drawing board to find a method of measuring and reducing stresses caused by the reefing and to strengthen the parafoil. But no system for measuring such forces in the cloth of a parachute existed.

Steve Fitzgerald of Engineering's Aeronautics Branch came to the rescue with a totally new method for instrumenting the leading edge of the parafoil and measuring the stresses it experienced. Fitzgerald worked with a Conroe company, Invocon Inc., that was developing tiny wireless data systems for NASA under a Phase III Small Business Innovation Research grant. Working with Fitzgerald, the company modified its systems to be used to measure forces in the parachute's canopy.

No such instrumentation had ever before been developed for a parachute, and the Invocon system now is expected to find widespread use outside of NASA within the parachute industry, Fitzgerald said.

"The people involved with parachute testing at the Army's Yuma Proving Ground are very interested, as well as others," Fitzgerald said. "This is the first time anyone has ever been able to do this, and that makes a lot of people involved in parachute testing excited."

The team spent the fall conducting a series of 20 subscale drop tests to measure forces on the

parafoil and modifications to the reefing system "With Steve's instrumentation, we were able to determine where and how much the load was on the parafoil and to modify the reefing system to reduce it," Muratore said.

As a result of the measurements, the parafoil was strengthened as well. The parafoil's manufacturer, Pioneer Aerospace, modified the parachute at its Columbus, Miss., facilities, replacing the material in the bottom of the parafoil with a new material twice as strong as before.

The success of all of the modifications was borne out in the first full-scale pallet drop test of the new parafoil conducted Dec. 12 in Yuma. "It was a beautiful test, and everything worked perfectly," Muratore said. "The parafoil problems have definitely been the biggest challenge we have faced so far in the project. But to find out these things is why you do a lot of testing. You want to find out these problems when you have a less expensive pallet underneath the parachute instead of a full test vehicle."

Following the planned February test of the first X-38 atmospheric test vehicle, which was outfitted at JSC and shipped to the Dryden Flight Research Center last summer, unpowered drop tests of three such vehicles will continue for the next two years. The first vehicle already has been through a series of captive carry flight tests, where it remained attached under the wing of the NASA B-52 aircraft.

For the February test, the vehicle will be dropped from an altitude of about 23,000 feet, flying free for only a few seconds before the parafoil is deployed. The drop tests will work up to an altitude of about 50,000 feet and longer free-flight times for the X-38 vehicles prior to deployment of the parafoil. The second X-38 atmospheric test vehicle, which includes active flight control surfaces, already is being outfitted at JSC in Bldg. 220. It is scheduled to be shipped to Dryden in March and perform a drop test in May. The airframe for the third atmospheric vehicle is currently under construction in California. It also will be outfitted at JSC.

In addition, the parts for an X-38 space test vehicle already are being fabricated by Engineering's Manufacturing, Materials and Process Technology Division. The nose and forward part of the cabin for the X-38 space test vehicle, planned to fly an unpowered space test from a space shuttle mission in 2000, already have been assembled in Bldg. 220. □



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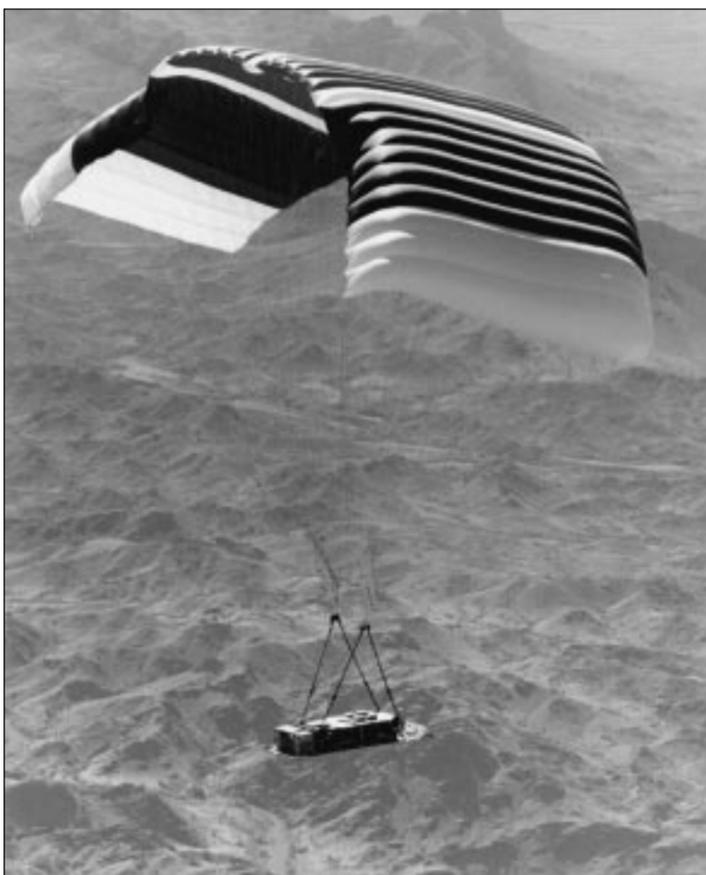


Photo Courtesy U.S. Army 97-C0505#36

Above: The first X-38 atmospheric test vehicle, outfitted at JSC and shipped to Dryden Flight Research Center last summer, has completed a series of "captive carry" flight tests where it remained attached under the wing of DFRC's B-52 aircraft. The vehicle is now being readied for its first drop test, targeted for early February. **Left:** Several months of subscale testing and redesigning paid off as a strengthened and more stable parafoil for the X-38 performed flawlessly in a full-scale pallet drop test at the Army's Yuma Proving Ground in early December 1997. The X-38 development team faced its toughest challenge so far when the parafoil tore in half during a similar drop test in October 1997. **Below:** Technicians at Dryden Flight Research Center receive the first X-38 advanced technology demonstrator on June 4. **Bottom:** A montage of photographs shows a 4-foot-long model of the X-38 gliding to Earth after a drop test from a Cessna aircraft.



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35 Years Ago at MSC

MSC representatives discuss roads with highway group

Reprinted from the Jan. 9, 1963, edition of Space News Roundup.

Manned Spacecraft Center officials met with State Highway Commission officials from Harris and Galveston Counties to discuss road-net requirements and traffic problems anticipated at the Clear Lake site within the next several years.

"We expressed our concern about critical traffic problems in that area in the near future," said Manager of Center Services Martin A. Byrnes. Following the meeting held at state Highway Commission Offices in Austin Dec. 13.

Our on-site population will increase in the next several years to somewhere in the neighborhood of 10,000 people per day. We are certain that this will happen before any date by which an adequate road-net can be constructed, unless the development of this net is begun almost immediately.

Byrnes said that by the end of 1965 "there will be about 3,000 of our own people, and another 7,000 contractor personnel and visitors going to and from the site. This is in addition to visitors or personnel from nearby developments, or supporting housing and shopping areas. If adequate roads are not available it could lead to a colossal traffic jam.

Byrnes and L.G. Lindquist, assistant for Congressional affairs to the director, presented figures in graph form showing NASA and center operating contractor population on the site hitting about 5,000 people by the end of the first quarter of 1964.

Including construction contractor personnel and other known allied

activities, a daily population of 8,000 by mid-1964 and 10,000 or more by early 1965 is expected.

"We have not projected... any firm figures for the work force of any of the many neighboring private building projects or the traffic generated by the occupants of the estimated 10,000 to 20,000 private homes which we understand are now planned in the areas surrounding NASA," Byrnes said.

Discussing possible solutions to the problem, Byrnes and Lindquist made three suggestions for possible additional roads, "compatible to existing plans."

Byrnes told the group he understood that work on Highway 528 which passes to the south of the site and now ends just to the east side of the area is "almost complete."

Our original concern after that is for additional road accesses to the north and south from the site. He said, "We suggest for this purpose a highway along the northwest side of the site which will connect Highway 3 and Red Bluff Road."

At the same time, there is needed a road to connect the north side of the site with the Ellington AFB area, Byrnes said, where NASA will have an operations strength of about 1,000 people through 1965.

At the present time some 25 percent of the MSC personnel live south of the Clear Lake site, and, Byrnes said, "there appears to be a firm need for additional access directly from the south of the Galveston County area.

"Our facilities people have had the opportunity to talk with our neighbors as well as with officials of both Harris and Galveston



S62-8636



S62-6755

Counties regarding existing plans for road nets. We have to the best of our knowledge, suggested routes which are compatible with all of these existing plans," Byrnes said.

Lindquist and Byrnes met with Galveston County officials in the morning and Harris county officials in the afternoon.

Clear Lake dock, channel plans to be postponed

Plans for dredging a 16-foot channel through Clear Lake and construction of a barge docking facility adjacent to the Manned Spacecraft Center have been deferred for several years, MSC officials have announced.

Officials pointed out the original plans had been to provide a waterway for barging of heavy components of Apollo spacecraft, which were too large for air or highway transport from point of manufacture to the NASA center at Clear Lake.

However, official adoption of the lunar orbital rendezvous mode of carrying out the landing of Americans on the moon has permitted reduction of the sizes of the modules of the Apollo vehicle to dimensions which permit other means of transportation than waterway.

Eventually, the docking facility and channel will be required and the funds intended for this use will be set aside until needed, but the need is not foreseen for several years.

Top: Sporting new curbstones, is a portion of Second Street looking south. It is presently being paved.

Above: The outside of an underground utility tunnel is nearing completion after which it will be completely buried when the trench is filled in.

Gilruth Center News

Hours: The Gilruth Center is open from 6:30 a.m.-10 p.m. Monday-Thursday, 6:30 a.m.-9 p.m. Friday, and 9 a.m.-2 p.m. Saturday.

Sign up policy: All classes and athletic activities are on a first come, first served basis. Sign up in person at the Gilruth Center and show a yellow Gilruth or weight room badge. Classes tend to fill up two weeks in advance. Payment must be made in full, in exact change or by check, at the time of registration. No registration will be taken by telephone. For more information, call x30304.

Gilruth badges: Required for use of the Gilruth Center. Employees, spouses, eligible dependents, NASA retirees and spouses may apply for photo identification badges from 7:30 a.m.-9 p.m. Monday-Friday; and 9 a.m.-2 p.m. Saturdays. Cost is \$10. Dependents must be between 16 and 23 years old.

Hatha Yoga: A stress relieving, stretching and breathing exercise routine to unite body, mind and spirit. Classes meet from 5:30-6:30 p.m. Thursdays. Cost is \$40 for eight weeks. The instructor is Maureen Siemers.

Nutrition intervention program: Would you like to learn more about the role diet and nutrition play in your health? This six-week program includes lectures, a private consultation with the dietitian and blood analysis to chart your progress. Program is open to all employees, contractors and spouses. For more information call Tammie Shaw at x32980.

Defensive driving: One-day course is offered once a month at the Gilruth Center. Pre-registration required. Cost is \$25. Call for next available class.

Stamp club: Meets every second and fourth Monday at 7 p.m. in Rm. 216.

Weight safety: Required course for employees wishing to use the Gilruth weight room. The next classes are scheduled for at 8 p.m. Jan. 8 and 22 (must be on time to receive credit for class). Pre-registration is required. Cost is \$5. Annual weight room use fee is \$90. Additional family members are \$50.

Exercise: Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is \$24 for eight weeks.

Aikido: Introductory martial arts class meets from 5:15-6:15 p.m. Tuesday and Wednesday. New classes begin the first of each month. Instruction is by a fourth-degree black belt. Learn to defend yourself and get a great aerobic workout. Cost is \$35 per month.

Step/Bench aerobics: Low impact cardiovascular workout. Classes meet from 5:15-6:15 p.m. Monday, Tuesdays and Thursdays. Cost is \$32 for eight weeks. Call Kristen Taragzewski, instructor at x36891 for more information.

Ballroom dancing: Classes meet from 7-8:15 p.m. Thursdays for beginner advanced classes and from 8:15-9:30 p.m. for beginner-intermediate and intermediate students. Cost is \$60 per couple.

Country and western dancing: Beginner class meets 7-8:30 p.m. Monday. Advanced class (must know basic steps to all dances) meets 8:30-10 p.m. Monday. Cost is \$20 per couple.

Fitness program: Health Related Fitness Program includes a medical screening examination and a 12-week individually prescribed exercise program. For more information call Larry Wier at x30301.

Registration for spring volleyball and basketball will start Jan. 12 and end Jan. 24.

Gilruth Home Page: Check out all activities at the Gilruth online at: <http://www4.jsc.nasa.gov/ah/exceaa/Gilruth/Gilruth.htm>

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Store from 10 a.m.-2 p.m. Monday-Thursday and 9 a.m.-3 p.m. Friday and in the Bldg. 3 Exchange Store from 7 a.m.-4 p.m. Monday - Friday. For more information call x35350 or x30990.

Moody Gardens: Tickets are \$9.75 for two of four events

Space Center Houston: Adults, \$10.25; children (4-11), \$7. JSC civil service employees free.

Movie discounts: General Cinema, \$5.50; AMC Theater, \$4.75; Sony Loew's Theater, \$5.

Shirts: International Space Station logo pique golf shirts, \$26 and \$28

Stamps: Book of 20, \$6.40

1998 Franklin Planners: Replacement refill orders being taken now.

Sweetwater Pecans: Orders are being taken now; cost is \$5.75 per pound.

Metro passes: Tokens and value cards available.

Book available: Suddenly Tomorrow Came: A History of Johnson Space Center.

Balloons: Balloon bouquets for all occasions, prices vary.

Houston Livestock Show & Rodeo: Tickets go on sale Jan. 28.

Roundup Deadlines

The Space News Roundup is published every other Friday. Story ideas should be submitted as far in advance as possible, but no later than two weeks prior to the date of publication.

The deadline for Dates & Data calendar items is three weeks prior to the date of publication.

Stories and ideas should be submitted to Kelly Humphries in Bldg. 2, Rm. 180, or via e-mail to kelly.o.humphries1@jsc.nasa.gov

People on the Move

Human Resources reports the following personnel changes as of Jan. 3, 1998. The retirements section does not include those who took buy-outs:

Key Management Assignments

Vernon Brown was selected as chief, Administration Office, White Sands Test Facility.
 June Boeckel was selected as chief, Financial Services Branch in the Financial Management Division, Office of the Chief Financial Officer.
 Janice Nesbitt was selected as chief, Cost Accounting, Reports, and Property Branch in the Financial Management Division, Office of the Chief Financial Officer.

Additions to the Workforce

Mike Ciancone joins the Flight Systems Safety and Mission Assurance Division in the Safety, Reliability, and Quality Assurance Office as an aerospace engineer.

Promotions

Ann Bronson was selected as a research grants specialist in the Space and Life Sciences Business Management Office.
 C. LaRue Johnson was selected as a secretary in the Space Shuttle Business Management Office.
 Georgia Way was selected as an administrative officer in the Center Operations Directorate.

Reassignments Between Directorates

Liz Cheshire moves from the Space Shuttle Program Office to the ISO 9000 Project Office.
 Joe Christian moves from the International Space Station Program Office to the Engineering Directorate.
 Pat Ford moves from the Engineering Directorate to the Center Operations Directorate.
 Kathy Packard moves from the Safety, Reliability, and Quality Assurance Office to the Space Shuttle Program Office.
 Heather Mitchell moves from the Mission Operations Directorate to the EVA Project Office.
 Robert Yowell moves from the Mission Operations Directorate to the EVA Project Office.

Reassignments to Other Centers

Joey Shelton of the International Space Station Program Office moves to Marshall Space Flight Center.

Retirements

Charles Gillespie of the Flight Crew Operations Directorate.
 Mickey Donahoo and Gary Robinson of the Mission Operations Directorate.
 Dale Denais, Dee Gregory, Ted Leech, Lubert Leger, Larry Rhodes, Manny Rodriguez, Bob Vogt, and W.B. Wood of the Engineering Directorate.
 Richard Hermling, Bob Ligons, and Jim Mistrot of the Space Shuttle Program Office.
 Dave Amsbury and Winston Blackmon of the Space and Life Sciences Directorate.

Resignations

Kathye Parma of the Human Resources Office.
 Leonard Halley and Paige Lucas of the Mission Operations Directorate.
 Dave Geller of the Engineering Directorate.
 Kirk Griffin of the International Space Station Program Office.



STS-87 Lead Flight Director Bill Reeves presents the mission plaque to Lead Propulsion Officer Catherine Larson as members of the "Prop" team gather. Back row, from left, are: Robbie Gest, Dave Swoboda, William Powers, Peter Clarke; middle row, Jill Reisman, Amy Marasia, Larson, Reeves; and front row, Cori Kerr, Bryan Lunney, Michael Moses, and Donald Biszek. Lonnie Schmitt is not pictured.

Propulsion team earns STS-87 plaque honors

STS-87 Lead Propulsion Officer Catherine Larson hung the flight plaque in the Mission Control Center following the flight as Lead Flight Director Bill Reeves and STS-87 Commander Kevin Gregel held the ladder.

Reeves said the Propulsion team earned the plaque hanging honors in recognition of its "outstanding management of the propulsion system thermal constraints, real-time computation and calls of propellant budgets that led to critical mission decisions throughout the STS-87 mission."

"This was an extremely busy and complex mission for us," Larson

said. "We had failures and flew attitudes that caused jets to be either too cold or to get too hot. We were called upon, during the initial Spartan deploy and re-grapple attempts, to compute real-time propellant bingos.

"The bingos allowed us to preserve the capability to re-rendezvous several days later and also to provide USMP with enough propellant to complete its mission. Following the successful Spartan rendezvous we evaluated numerous flight plans and mission scenarios in an effort to maximize overall mission success. With all that we had on our plate, the 16 day mission really flew by," she said.

JSC workers earn Silver Snoopy Awards

Sixty-nine JSC employees have, in recent months, become proud recipients of the much-coveted Silver Snoopy Award.

Civil service employees honored with Silver Snoopy awards are Rodney Etchberger, Joyce Repa, and Kelly Rubio, all of the Business Management Directorate; Ronald Stone, Melody Nation, and Jesse Goodson, all of the Center Operations Directorate; and Kathleen Kaminski, EVA Project Office.

Other recipients included Robert Williams, Flight Crew Operations Directorate; Patricia Church, Information Technology Office; Jean Carter, Office of the Chief Information Officer; Daniel Duncavage, Phase 1 Program; and Raymond Reynaud, Safety, Reliability, and Quality Assurance Directorate.

Additional civil service recipients were Gary Kitmacher, Space and Life Sciences Directorate; Raymond Nieder, Space Shuttle Program Office; Michael Surber, Kevin Watson and Dan Hartman, all of the Space Station Program Office; and Michael Kirsch, White Sands Test Facility.

Contractor recipients of the award included Gene Frye, Ron Lee, Ralph Tapphorn and Paul Ziehl, all of AlliedSignal Technical Services Corp.; Isaac Donovan, Dyncorp.; Paul Judas, GB Tech; Leanne Brasington and Gary Duncan, both of GHG Corp.; David Buscarello and Steve Dionne, both of Hamilton Standard; James Rainwater, Aaron Simpson and Eugene Volentine, all of Hernandez Engineering; John Murphy, Patricia O'Connell and Jimmy Payne, all of Johnson Engineering; Beth Ann

JSC employees accept buyout

JSC's Human Resources Office has announced the following employees have received the 1997 buyout and have separated from service with the government:

Human Resources Office: Patricia Knoll.

Equal Opportunity Programs Office: Joseph Atkinson Jr., Charles Hoskins.

ISO 9000 Office: Monica Barkis.
 Business Management Directorate: Ann Philpot (Sullivan), John Thiel, Terrence Heil, Rita, Sommer, Henry Bair III.

Flight Crew Operations Directorate: Frank Newman, Bill Robertson.

Mission Operations Directorate: Joseph De Atkine, Walter Gaylor, Theodore Eggleston, John Kamman, Roger Burke, Leon Payne, Gene Ricks.

Engineering Directorate: Donald Blevins, Marion Coody, Donna Fendell, Alan Rochford, Troy Stewart, Hubert Brasseaux, Jon Erickson, Donald Tillian, George Zupp Jr., Robert Krause, Charles Teixeira.

Information Systems Directorate: Robert Beckham, David Schultz, Welby Ward.

Center Operations Directorate: Keith, McQuary, Fredric Toole.

Office of the Chief Financial Officer: Mary Nordin, Martha Speller.

Space Shuttle Program: Carl Shelly, Sue Ann Corke, Arthur Reubens, Thomas Loe,

Safety, Reliability and Quality Assurance Office: Rebecca Derbonne, Duane Duston, Fernando Fabbri, Coy Martin.

Space Station Program Office: Wendell Elrod, Alfred Menchaca, Robert Lewis, Ronald Zaguli.

White Sands Test Facility: Carol Irby, Grady McCright, Lindsey Irby, Leroy, Luchini, James Powell.

Space & Life Sciences Directorate: Timothy White, James Moore, John Zieglschmid, Lewis Wade, Kenneth Demel, Charles Harris.

Space Operations Management Office: Jimmie Maley.

Do you know someone deserving?

The Silver Snoopy Award, 1998. An indication of a surprise administered by the Space Flight Awareness Program, is the astronauts' personal award to individuals who have performed an outstanding effort contributing to the success of manned space flight missions.



A call for Silver Snoopy nominations will be out soon for

presentation is the special blue Snoopy "Symbol of Excellence" poster on display in work areas. Any individual whose job performance has contributed significantly to flight safety and mission success is eligible for this special award.

Dates & Data

Jan. 19

Martin Luther King Day: Most JSC offices will be closed Jan. 19 in observation of the Martin Luther King Jr. Day holiday.

Jan. 21

Spaceland Toastmasters meet: The Spaceland Toastmasters will meet at 7 a.m. Jan. 21 at the House of Prayer Lutheran Church. For more information, call Jeannette Darcy at x45752.

Communicators meet: The Clear Lake Communicators will meet at 11:30 a.m. Jan. 21 at Lockheed Martin, 555 Forge River Road. For more information, contact Richard Lehman at 281-333-6004 or Melissa Sommers at 281-332-0698.

Spaceteam Toastmasters meet: The Spaceteam Toastmasters will

meet at 11:30 a.m. Jan. 21 at United Space Alliance, 600 Gemini. For details, call Patricia Blackwell at 281-282-4302 or Brian Collins at x35190.

Scuba club meets: The Lunarflins will meet at 7:30 p.m. Jan. 21 at the Redfish Restaurant under the Kemah/Seabrook bridge, Seabrook side. For more information, call Fred Toole at x33201.

Jan. 27

Grand Rounds: January Space Medicine Grand Rounds will present Dr. Charles LaPinta, NASA Flight Surgeon at 8:30 a.m. Jan. 27 in the Berkner Room of the Center for Advanced Space Studies, 3600 Bay Area Blvd. LaPinta will discuss "Memories of Apollo". Credit for Continuing Medical Education will

be available. For more information, call Kay Nute at 244-2019.

Jan. 28

Spaceland Toastmasters meet: The Spaceland Toastmasters will meet at 7 a.m. Jan. 28 at the House of Prayer Lutheran Church. For more information, call Jeannette Darcy at x45752.

Communicators meet: The Clear Lake Communicators will meet at 11:30 a.m. Jan. 28 at Lockheed Martin, 555 Forge River Road. For more information, contact Richard Lehman at 281-333-6004 or Melissa Sommers at 281-332-0698.

Spaceteam Toastmasters meet: The Spaceteam Toastmasters will meet at 11:30 a.m. Jan. 28 at United Space Alliance, 600 Gemini. For details, call Patricia Blackwell at

281-282-4302 or Brian Collins at x35190.

Astronomy seminar: The JSC Astronomy Club will meet at noon Jan. 28 in Bldg. 31, Rm. 129. An open discussion meeting is planned. For more information, call Al Jackson at x35037.

Jan. 29

Radio Club meets: The JSC Amateur Radio Club will meet at 6:30 p.m. Jan. 29 at the Piccadilly, 2465 Bay Area Blvd. For more information, call Larry Dietrich at x39198.

Feb. 4

Astronomy seminar: The JSC Astronomy Club will meet at noon Feb. 4 in Bldg. 31, Rm. 129. An open discussion meeting is planned.

For more information, call Al Jackson at x35037.

Spaceland Toastmasters meet: The Spaceland Toastmasters will meet at 7 a.m. Feb. 4 at the House of Prayer Lutheran Church. For more information, call Jeannette Darcy at x45752.

Communicators meet: The Clear Lake Communicators will meet at 11:30 a.m. Feb. 4 at Lockheed Martin, 555 Forge River Road. For more information, contact Richard Lehman at 281-333-6004 or Melissa Sommers at 281-332-0698.

Spaceteam Toastmasters meet: The Spaceteam Toastmasters will meet at 11:30 a.m. Feb. 4 at United Space Alliance, 600 Gemini. For details, call Patricia Blackwell at 281-282-4302 or Brian Collins at x35190.

NASA Briefs

Astronomers detect background glow

Astronomers have assembled the first definitive detection of a background infrared glow across the sky produced by dust warmed by all the stars that have existed since the beginning of time. For scientists, the discovery of this "fossil radiation" is akin to turning out all the lights in a bedroom only to find the walls, floor and ceiling aglow with an eerie luminescence. The telltale infrared radiation puts a limit on the total amount of energy released by all the stars in the universe. Astronomers say this will greatly improve development of models explaining how stars and galaxies were born and evolved after the Big Bang. The discovery reveals a surprisingly large amount of starlight in the universe that cannot be seen directly by today's optical telescopes, perhaps due to stars being hidden in dust, or being too faint or far away to be seen. The discovery culminates several years of meticulous data analysis from the Diffuse Infrared Background Experiment aboard NASA's Cosmic Background Explorer, which was launched in 1989.

Galileo begins extended mission

NASA's Galileo spacecraft made its closest-ever flyby of Jupiter's icy moon Europa on Dec. 16, marking the start of an extended mission that will focus on new and tantalizing scientific questions raised by its just-completed, highly successful two-year primary mission. "Galileo has earned a place in history as the first mission to orbit an outer planet," said Dr. Wesley Huntress, NASA's associate administrator for space science. "Galileo already has returned a wealth of new information in its two-year scientific exploration of Jupiter's atmosphere and system of moons. But the best yet may still be ahead of us." Galileo dipped over Europa at an altitude of only 124 miles with the signal received on Earth at 6:49 a.m. JSC time. This was the first encounter of the Galileo Europa mission, which began formally on Dec. 8, following the end of Galileo's primary mission and will study Jupiter's icy satellite in detail in hopes of shedding more light on the intriguing prospect that liquid oceans may lie under Europa's ice crust.

Hubble witnesses end of star's career

The end of a sun-like star's life was once thought to be simple: the star gracefully casting off a shell of glowing gas and then settling into a long retirement as a burned-out white dwarf. Now, a dazzling collection of detailed views released by several teams of astronomers using NASA's Hubble Space Telescope reveals surprisingly intricate glowing patterns spun into space by aging stars: pinwheels, lawn sprinkler style jets, elegant goblet shapes, and some that look like rocket exhaust. "These eerie fireworks offer a preview of the final stage of our own Sun's life," says Bruce Balick of the University of Washington, Seattle. More than simply a stellar "light-show," these outbursts provide a way for heavier elements—predominantly carbon—cooked in the star's core, to be ejected into interstellar space as raw material for successive generations of stars, planets and, potentially life. Details are at: <http://oposite.stsci.edu/pub/info/Latest.html>

Rodeo riders to 'clip clop' through JSC

For the third year in a row, JSC is sponsoring a number of "Rodeo Liff" activities in cooperation with the Houston Livestock Show and Rodeo and the local NASA/Clear Creek/Friendswood Go Texan Association.

Representatives from the Houston Livestock Show and Rodeo Speakers Bureau will make presentations at the Bldg. 3 cafeteria during

lunch on Jan. 30 and Feb. 6, as well as providing clowns and a small animal demonstration at the JSC Child Care Center. Employees who are horse riders and want to join the JSC Circle Riders on Feb. 10 may call Rose Gardner at x30331.

The Texas Independence Trail Ride, a group of about 150 horses and riders plus 10 wagons will enter JSC on Feb. 10, where they will be

met by the JSC Circle Riders, a group of JSC employees who ride horses. This combined group will conduct a trail ride through the center and stop at the Gilruth Center.

The highlight of this year's event will be an overnight camp-out near the Gilruth Center by the Texas Independence Trail Riders.

The local Go Texan committee is hosting a dinner dance the evening

of Feb. 10 in the Gilruth Center ballroom beginning at 7 p.m. All JSC employees are invited to attend. Tickets are \$15 and include a catered dinner by Sonny's Crazy Cajun Steak House. Proceeds will go to the scholarship program of the Houston Livestock Show and Rodeo. Call Nancy Goldstein at (713) 888-3026 for more information and tickets to the dinner dance.



JSC Photo by Robert Markowitz

OFFICIAL VISIT—Isao Uchida, president of the Japanese Space Agency, NASDA, gets an up-close look at flight simulation equipment in Bldg. 5 during a visit to JSC on Dec. 8. Uchida was accompanied by Astronaut Koichi Wakata and facility manager Charlie Spencer. Uchida also met with JSC Director George Abbey and received briefings on virtual reality, the AER-Cam free-flying robot camera spacecraft, and the X-38 vehicle and its development and test program.

Endeavour returns to flight line-up

(Continued from Page 1)

Endeavour's twelfth mission in space follows its last flight more than a year and a half ago on STS-77, which, coincidentally was the first and last mission on which Andy Thomas was a crew member. He has been training in Russia for a year as Wolf's backup, but never expected actually to fly on a long-duration mission.

That changed when space walk tasks were identified that required Wolf's participation rather than that of Wendy Lawrence, who could not fit safely in the Russian space walking suit. She flew on the last docking mission and also will fly on the last scheduled docking mission with Mir/STS-91—to bring Thomas home.

During the flight, the crew will deliver some 7,000 pounds of equipment and supplies to Mir and return experiment samples and equipment to Earth.

Wilcutt's third flight will be his first as commander. He piloted *Atlantis* on the STS-79 mission, which was the fourth to dock with Mir. That mission was the first to transfer American crew members John Blaha for Shannon Lucid.

Dunbar will fly for the fifth time on the shuttle. Her space flight experience includes the first ever shuttle docking with Mir on STS-71. She had trained prior to that flight as Dr. Norm Thagard's backup to be the first American on Mir. Edwards, Reilly and Sharipov are flying for the first time.

Powerful nearby jets provide clues to quasars

(Continued from Page 2)

Goddard. "At fairly regular intervals, the accretion disk is disrupted and a fast moving jet is produced."

"This jet is staggeringly more powerful than a geyser," added Swank. "Every half-hour, the black hole, in the constellation Aquila, throws off the mass equal to that of a 100 trillion ton asteroid at nearly the speed of light (approximately 650 million miles per hour). This process clearly requires a lot of energy—each cycle

is equivalent to six trillion times the annual energy consumption of the entire United States."

"What is even more amazing is that we are seeing the first clues to the source of matter ejected in the jets—the correlations we discovered indicate that the jet material must come from the inner disk. For years theorists have hypothesized that the jets come from somewhere close to the black hole, but no one had ever actually seen that direct link until

now," Eikenberry said.

Black holes are massive, with gravitational fields so intense that nothing near them, not even light, can escape. While this prevents anyone from observing black holes directly, their presence can be inferred from effects on nearby matter.

Many of the known or suspected black holes are orbiting a close "companion" star. The black hole's gravity pulls gas from the companion star into a swirling disk of material

which orbits around the black hole, much as soap suds swirl around a bathtub drain. As it falls into the black hole, the gas in the disk is compressed and heated to millions of degrees, emitting X-rays.

"This is like having a miniature quasar in your back yard; and, because it is much smaller, it changes over minutes and hours, rather than months and years. This will let us learn a lot in a much shorter period of time," Eikenberry said.

Rothenberg brings wealth of experience

(Continued from Page 1)

the success of the first servicing mission to the orbiting Hubble, correcting an optical flaw and restoring the telescope to full scientific capacity.

Diaz joined NASA as a cooperative education student at the Langley Research Center in 1964. He was actively involved in the Viking Project from 1969 to 1977 in a variety of roles. In 1979, he moved to NASA Headquarters and had a broad range of experience in the management of space science projects, including program management of the *Ulysses* and *Galileo* missions. Before moving to Goddard in 1996, he served as Deputy Associate Administrator for Space Science.



The Roundup is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for all space center employees. Deadline for the submission of articles is Friday, three weeks before the desired date of publication.

The Roundup office is in Bldg. 2, Rm. 181. The mail code is AP3. The main Roundup telephone number is x38648, and the fax number is x45165. Electronic mail messages may be directed to kelly.o.humphries1@jsc.nasa.gov.

Editor Kelly Humphries

New internal home page to speed Internet access

(Continued from Page 1)

and a short loading time are expected to reduce the time required to find what's needed.

The content of the rest of the page was designed with a clean, neat hierarchical approach that defines the intent of the new JSC Internal Home Page for 1998. The links are presented with originality, ranked by their impact or importance and they also are easy to use. The more hierarchical approach consists of five major categories: alerts, news and events, information, organizations and services.

"The previous JSC Internal Home Page that was released in

1995 had become a collection of lists. Hard to navigate and important items were not highly visible," said Chris Ortiz of the ISD Internet Group. Friske was tasked to "make it organized, simple, understandable, and easy to navigate."

At the same time the new internal page goes on-line, the external home page will get a minor facelift that synchronizes its graphics with the new internal page and give access to internal and external sites.

To access the new internal page, visit the external page at <http://www.jsc.nasa.gov> and click on "Employees," or go directly to <http://www4.jsc.nasa.gov>.